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ABSTRACT

This study examined the process of action research in two schools that were part of a larger action research community in a suburban and urban school setting. The study used a qualitative multiple-case study research design using ethnographic techniques to follow the two schools as they conducted action research during the 1993-1994 school year. At the elementary school site, the entire faculty participated in action research that was teacher-conceived and driven. At the middle school site, the action research occurred in the mathematics department. Action research there was teacher-conceived and driven, but little administrative support was offered. Data came from documents from each site and interviews with two teachers at each school and the principal of the elementary school. Findings show how the action research process evolved at each site, using the metaphor of dance. The study identified four factors that facilitate the process of action research: (1) knowledge of the action research process; (2) time; (3) support for the practitioner; and (4) teacher identification and selection of the topic to be studied. Three factors were found to hinder the process of action research: time, lack of equipment and resources, and lack of understanding and use of the reflective aspect of action research. (Contains 4 tables and 76 references.) (SLD)

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A Multiple-Case Study of Schools Participating in Action Research

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Abstract

The purpose of this study is to examine the process of action research in two schools participating in action research. These schools were part of a larger action research community in a large suburban urban school setting. This study conducted in 1995 has lead to further work with teachers conducting action research in both public schools and university settings through the professional development school model. The purpose of this presentation is to share initial research results enhancing the understandings of what facilitates the success of teachers conducting action research.

Four research questions guided this study:

- What does action research look like in a school?
- What happens to the teachers who participate in action research?
- What facilitates the process of action research?
- What hinders the process of action research?

Although much has been written about school reform in the past decade insufficient attention has been given to the important relationships among the adults within the school and to the consideration of how their abundant untapped energy, inventiveness and idealism within the schoolhouse might be encouraged (Barth, 1990). "We are coming to understand that loose coalitions and networks are powerful means to engage teachers in thinking hard about their work while encouraging them to take new risks and responsibilities by providing socially supportive conditions" (Lieberman, 1988, p. 5). Glickman and Calhoun (1991) remind us that school renewal must happen in the schools, where the process of change begins with teachers. Other authors suggest that by adopting a research stance, teachers are liberating themselves from the control position they so often find themselves in (Barth, 1990; Hopkins, 1993; Sagor, 1992;

Strickland, 1988). The role of action research in school restructuring is emphasized by many educators. (Lieberman and Miller, 1991; Dillon-Peterson, 1991; Stremmel, 2002).

This study draws from the research on school reform (cited in Brandt, 1993; Lieberman & Miller, 1991 and others) as well as the writings on the history of action research, definitions and cycles of action reseasrch (Corey, 1953; Lewin, 1947; Kemmis and McTaggart; 1988). The research design used in this study is based on techniques for ethnographic research (Bogdan & Biklen, 1992; Spradley, 1979) and multiple-case study research (Merriam, 1988; Yin, 1989).

Methods

This study used a qualitative multiple-case study research design using ethnographic techniques to follow two schools as they conducted action research during the 1993-94 school year. The setting for this research was in a large majority minority school district. The individual school sites consisted of an elementary and a middle school. In the elementary site the entire faculty participated in action research which was teacher conceived and driven. The principal played a supportive role. In the middle school site, the mathematics department was involved in action research. While this site was also teacher conceived and driven, the initial concept came from one teacher who later worked hard at including the rest of his colleagues. At this site there was little administrative support offered to teachers. The diversity of these two sites added richness to the study.

Yin (1989) calls for the use of six data sources in case study design: documentation, archival records, interviews, direct observation, participant-observation, and physical artifacts. During this study I collected and analyzed a variety of documents as collected by each site including an end of study executive report and portfolio. I also examined selected teacher journal entries. Extensive interviews were conducted at both sites. At the elementary site, two teachers

and the principal were interviewed three times with each interview lasting approximately one hour. At the middle school site, two teachers were interviewed with the same logistics. The interviews were audio taped and transcribed. At the conclusion of this study, a focus group was conducted with key informants from both sites. I visited each site twice a month to observe classrooms and action research meetings and discussions. A variety of student work was examined as well as teacher lesson plans and videotapes.

For this study, all interviews were audio taped and transcribed verbatim. Analytical notes were made in the margins of these protocols and emerging themes were color-coded. Summary analytic memos were prepared for each observation. Documents were sorted into major categories such as meeting minutes, reports, etc. Multiple readings were made of the transcripts and notes to provide a more holistic conception. A copy of the notes was cut into strips and sorted into themes. These were displayed on large charts. Within each major theme area a retrieval chart with a matrix of sub-categories and sources was prepared. Recurring patterns and themes were noted and tested for plausibility. Findings were also triangulated with data from different sources using different methods. In addition, disconfirming evidence was sought to determine if such data could shed new light on the findings. Finally feedback through a mixed site focus group was solicited from informants to confirm findings.

Findings

The first section of the findings describes how the process of action research evolved at each site using the metaphor of dance. Aristotle said "The greatest thing in styles is to have a command of metaphor. The first metaphor is teachers dancing with a new dance partner, action research. By looking at the action research process through the lens of dance I am then able to talk about how this compares to the Concerns-Based Adoption Model (CBAM) and the

Emotional Cycle of Change by Kelley and Conner (Jones and Pfeiffer, 1979).In addition common themes that were identified: collaboration, collegiality, self-confidence and empowerment. Within each theme sub themes are identified such as how others view my confidence and how I view my confidence. This study identified four factors that facilitate the process of action research: knowledge of the action research process, time, support for the practitioner, and teacher identification and selection of the topic to be studied. This study also identifies three factors that hinder the process of action research: time, lack of equipment and resources, and a lack of understanding and use of the reflective piece of action research.

This study holds implications for schools and school systems that are interested in conducting action research. These implications address the process of action research, the implementation of action research, and the training issues related to each. While much of the literature on action research tells us how to conduct action research, this study goes further and tells what it looks like in a school setting and what makes action research work for teachers and other practitioners.

Introduction and Rationale

Although much has been written about school reform in the past decade in national reports, studies, and descriptions of findings, insufficient attention has been given to the important relationships among the adults within the school and to the consideration of how their abundant untapped energy, inventiveness and idealism within the school house might be encouraged (Barth, 1990). The data of Henry and Sutton's (1999) research showed that "teachers are concerned about their students' learning and are continuing to ask questions about how to facilitate that learning (p. 8). Strategies to encourage reflective practice are journals, cognitive coaching, and conducting action research.

In part, the move to restructure schools involves teachers in expanded leadership roles where they are increasingly responsible for curriculum development, staff development, mentoring and creating alternative assessments. "We are coming to understand that loose coalitions and networks are powerful means to engage teachers in thinking hard about their work while encouraging them to take new risks and responsibilities by providing socially supportive conditions" (Lieberman, 1988. p. 5).

Schlechty reinforces the new role that teachers will take in restructuring as dealing with "how power is distributed and how decisions are made" (cited in Brandt, 1993. p. 11). He also suggests that in the process of restructuring, teachers be viewed as leaders and inventors.

Glickman and Calhoun (1991) remind us that school renewal must happen in the schools, where the process of change begins with teachers. Other authors suggest that by adopting a research stance, teachers are liberating themselves from the control position they so often find themselves in (Barth, 1990; Hopkins, 1993; Sagor, 1992; Strickland, 1988).

The role of staff development in the restructuring process has been reviewed by researchers (Futrell, 1991; Lieberman and Miller, 1991; Dillon-Peterson, 1991). Staff developers will become problem solvers, co-learners, action researchers, and experts in organization development. To support change in the educational system, Fullan (1991) contended that we must support teachers through their individual growth.

The Project

The School-Based Instructional Decision Making (SBIDM) grant program was a partnership between a school system and the State Department of Education in response to the implementation of the state-testing program. This multiyear collaboration between the local

system and the state department of education involved staff development, organization development, and strategic planning related to site-based decision making. The program extended the school system's existing commitment to school improvement through a focus upon site-generated instructional decision making, curriculum planning and implementation, ongoing training and staff development.

Schools were invited to participate in a competitive application process for a series of action research grants allocated according to the needs of the individual school itself and the strength of the grant proposal. Fifty of the 120 schools in the school system applied for action research grants. Thirteen funded grants were announced in May 1994.

The Sites

Two of the thirteen sites were selected for this study. The first site had a principal who was involved and interested in the action research process. The entire staff participated in the action research grant, which was conceived and written by both the principal and a small group of teachers. In contrast, the second site consisted of a middle-school mathematics department where one of the teachers conceived of the ideas and wrote the grant. There was no direct administrative leadership for the grant so the action research process was teacher conceived and driven. These sites offered a look at action research in settings where there were similarities and differences. The diversity of these two sites added richness to the study.

Site One was an elementary school located in a suburban middle-class subdivision of single-family homes. The school had 580 students, a high English as a Second Language population, twenty-one teachers and the principal. The focus of their research was on designing and implementing interdisciplinary performance assessments throughout the school year. Teachers met on a regular basis in cross-disciplinary focus groups to design their performance

assessments and offer one another technical assistance and support. In addition, these focus groups discussed their research by using individual reflective journals as a focal point. This site received a $7,000 grant award to support their research.

To guide their action research, the teachers at this site identified the following research question: "What changes in teaching and subsequent effects on learning will occur as a result of teachers designing and implementing interdisciplinary performance assessments based on county and state outcomes in grades K-6?" The grant application stated that "Over a 10 month period, teachers would be involved in ongoing experimentation and reflection in study groups to improve teaching methods and increase our students' ability to be real- life problem solvers."

I collected data at this site through observations of focus groups, steering committee meetings, staff development events, interviews, and analysis of artifacts consisting of surveys and school documents. The structured interviews were conducted with three informants, two classroom teachers, and the principal. I chose Gail, a 22-year veteran teacher as a key informant because she had taught at the school for three years and in her role as reading teacher had a global perspective of life at this site. Gail worked with small groups of students in her classroom and went into teachers' classrooms to team-teach and conduct demonstration lessons. The second informant at this site was Judy, a fifth-grade teacher. Like Gail, Judy also served on the action research steering committee. Judy was one of the younger members of the staff with six years of teaching experience. She demonstrated to the rest of the staff a performance assessment she had used in her classroom the previous year. The principal recommended that I interview Judy for this study. I appreciated this recommendation because I may not have chosen Judy because she is quiet, and I did not realize how instrumental she would be in conducting this school's action research.

The principal of the elementary school volunteered to be interviewed for this study. Susan, who has twenty-eight years of experience in education, is a fifth-year principal in the county. She seemed excited to be involved in the study and to talk about her school and the teachers. All three informants remained important throughout the school year.

Site Two of this study, a middle school, is surrounded by apartments and small town houses. The staff of this school consisted of fifty-two teachers, a building principal, and vice-principal. The action research grant was awarded to the mathematics department, which consisted of eight mathematics teachers. The grant was written by one of these teachers, John. The two key informants, John and David, were the facilitators of the action research. John was a third year teacher and he recommended that I also interview David, a second year teacher. Nancy, a third year math teacher, became more involved as the school year progressed so I spoke to her informally and included her in the cross-site focus group.

The focus of their action research grant was Multimath, a new teaching environment of video lessons that were enhanced with the use of graphics, sound, and animation. Their action research was designed to answer the following five questions:

1. What effect do the video lessons have on the students, the teachers, and the classroom environment?
2. What is causing our low math scores?
3. Can statistical analysis answer lingering questions about learning environment and the students?
4. What effect do attendance, class participation, and completion of homework have on the students' test scores?

5. Will the intense review given during the Multimath project create a higher passing rate on the next state testing date?

I collected data at this site through structured interviews with two teachers, informal conversations with other members of the mathematics department, observations of math department meetings and work sessions, and analysis of school and department artifacts.

Data and Methods

Interviews were the major form of data collection for this multiple-site case study. Bogden and Biklen (1992) say that interviews may be used in two ways in qualitative research: a) as the dominant strategy for data collection, or (b) with participant observation, document analysis, or other techniques as is the case for this study.

The key informants at each site were interviewed three times with each interview lasting approximately one hour. The interviews were taped and transcribed verbatim. At the end of the study, the key informants were interviewed again using focus group format led by an external consultant, who interviewed me before the focus group. The focus group was audiotaped and the transcriptions were once again verbatim. This end of study mixed-site focus group revisited the grand tour and mini-tour questions as well as the study's original research questions. In addition, the focus group participants were asked to react to and comment on the researcher-identified emerging themes from previous data collection sources.

Using Spradley (1979), interview questions were developed:

1. Grand Tour Questions. The interviews in this study began with the two questions: "What is happening as you conduct action research?" What are you seeing during the action research process?"

2. Mini-Tour Questions. These are often used as follow-up questions. The mini-tour questions used in this study include the following:
    - How are you feeling about being a teacher researcher?
    - What is working?
    - What changes are you seeing?
    - What are the benefits of participating in action research?
3. Example Questions. The example questions included in this study were based upon the transcripts of preceding interviews. Some example questions included the following:
    - Can you give me an example of what has supported your role as a teacher researcher?
    - Can you give me an example of how you have collaborated with another teacher during the action research process?
4. Direct Observation. During this study, I visited each site a minimum of twice a month. These observations were less formal, as described by Yin (1989). During this time, I observed training events, planning sessions, and focus groups; took notes during observations and immediately thereafter added specific comments and my impressions.
5. Participant-Observation. In this mode of observation, the investigator is not merely a passive observer. Instead, the investigator may take a variety of roles within a case study situation and may actually participate in the events being studied. During this study, I conducted training, facilitated meetings, answered procedural questions, and offered technical assistance.

6. Physical Artifacts. A final source of evidence is a physical or cultural artifact – a technological device, a tool or instrument, a work of art, or some other physical evidence. At the elementary site, student projects created as a result of the teacher-designed performance assessments were examined. At the middle school site, student artwork related to Multimath, and the computer programs created for the video productions were examined.

For this study, each of the five informants was interviewed three times in one-hour sessions. All interviews were audiotaped. The tapes were transcribed verbatim. This allowed me to revisit the same events with some distance. Analytical notes were made in the margins of these protocols, and emerging themes were color-coded. Summary analytic memos were prepared for each observation. Documents were sorted into major categories—meeting minutes, correspondence, reports, forms, articles—and sub-categories as appropriate.

Multiple readings were made of the transcripts and notes to provide a more holistic conception. A copy of the notes was then cut into strips and the narrative text of vignettes and quotes sorted into themes. These were taped and displayed on large charts. Within each major theme area, a retrieval chart with a matrix of sub-categories and sources was prepared. These displays of the data helped to organize the material compactly for analysis.

Several strategies offered by Miles and Huberman (1984) for generating meaning were employed. Recurring patterns and themes were noted and tested for plausibility. Findings were also triangulated with data from different sources using different methods. In addition, disconfirming evidence was sought to determine if such data could shed new light on the findings. Finally, feedback was solicited in an informant focus group to confirm the findings.

In writing this research, the voices of the teacher researchers were heard. They made the study interesting, exciting, and alive. The focus was on two basic elements. Assertions were made about the findings and the evidence was displayed. The evidence consisted primarily of narrative vignettes, quotes, and commentary. Narrative vignettes helped portray the conduct of everyday life in the schools and conveyed a sense of being there. Direct quotes provided the point of view of those studied. Interpretive commentary was offered to help frame the findings.

Findings

The findings are organized into four sections: The first section tells how the process of action research evolved at each site. Their stories unfold using a metaphor of dance and an emerging cycle of implementation. The second section examines the series of themes common to each action research school. The third section contrasts the two sites in terms of the emerging themes, their overall approach to action research, the content and results of their research, the role of the principal, and my role with their action research. The fourth section discusses the more practical issues of time and other supports needed to make action research more feasible.

To answer the research question, "What does action research look like in a school or school team?" I chose the metaphor of dance to describe the action research process and implementation cycle. At the onset of this research, I was familiar with life in schools, including the teachers, administrators, and students, as well as the environment of their relationships and communications. At the onset of this research, however, I was not familiar with action research. Therefore, as I collected and analyzed data, I experienced learning a new process (action research) with a familiar friend (schools). To step back and view this action research process with a different lens, I looked to the idea of metaphors.

The use of metaphors is encouraged in the writing of Eitington (1989) as a way to see the obvious and familiar in a new light.

> Metaphors encourage a change of perspective which helps the readers see new principles, relationships, possibilities. Metaphors help us view a situation, concept or behavior in ways which may be new, or concrete, or more vivid (p. 159).

It was important to me that the metaphorical image emerge from the action research process. I chose dance because it has always been a passion in my life, both as a participant and an observer. I have always observed dance through two lenses. Viewing dance through a wide angle lens has enabled me to see and feel the flow of the movement so the dancers' interactions. Whereas, focusing on an individual dancer through a telescopic lens, I was able to see and feel the integral parts that made up the whole.

As I spent time collecting and analyzing data, I began seeing these teachers as dancers dancing with the partner of action research, repeating over and over again the set of dances characteristic of the implementation cycle. These dancers moved through a series of dances which emerged as the phases of the implementation cycle described in the teachers' stories. The implementation cycle was composed of four dances: excitement, uncertainty, fear, and confidence. Dancers practice alone and in groups, and so did these teacher researchers. Seeing the process of action research and these teachers as dance partners and the implementation cycle as a series of four dances that these teachers would learn helped me focus the setting and the process through a different lens. Summary charts of these dances are included at the conclusion of this paper.

Going back and forth between different lenses, I was able to observe these teachers dancing alone and in groups. All the while dancing with their new partner—action research.

Like dancers these teachers experienced what is like to learn new steps, practice long hours, attend exhausting rehearsals, perform for different audiences, and finally receive ovations for their performance. Like dancers, these teachers learned how difficult it is to take the small solo steps and choreograph them into a group performance.

As the teachers began dancing with action research, a variety of dances would appear at both sites: the dance of excitement, the dance of uncertainty, the dance of fear, and the dance of confidence. The dances and their steps would differ. The dance of excitement was to the tune of romance. The dance of uncertainty involved awkward steps. During the dance of fear, teachers seemed to dance to an unknown melody. And, finally, the teachers grabbed their new dance partner, action research, and danced the majestic dance of confidence.

The Elementary Site's Dances

The dance of excitement begins. The dance of excitement occurred initially when teachers felt the thrill of their action research being selected for funding and the anticipation of beginning their projects. They seemed to have the same burst of energy that propels dancers at the beginning of a performance. At the elementary school, learning that their school would be one of the action research schools brought an immediate response of excitement from the staff. At an initial summer meeting, we sat in a semicircle of conference tables with twenty-one teachers and the principal. I asked, "How are you feeling about participating in action research?" I was unprepared for the power of emotions that followed:

- "There has been a different tone for the school."
- "Everyone is about kids."
- "I feel much more like a professional."
- "I feel an ambition I have never felt."

- "As a first year teacher I have seen what kinds of professionals I work with."
- "It made me feel that we were equal."
- "It has made me stay in this county and teach."

The attendance at this meeting was impressive: twenty-one of the twenty-seven teachers were present. Bringing these absent staff members into the fold when school began was discussed and the members decided to establish study partners, like new dancers of the troupe being taken under the wings of veterans.

The dance of uncertainty. The elementary teacher dancers were continuously uncertain of the next step and seemed to feel some awkwardness in creating their performance-tasks and learning to dance with their new partner, the action research process. Teachers were divided into four cross-grade level focus groups to share their performance tasks, instructional issues, and their roles as teacher researchers. At their first focus group meeting teachers were unwilling to talk about action research. The leader of the group made an attempt to explain action research to a silent group. As each teacher shared their performance tasks, the dance of uncertainty was evident as they maintained eye contact with Judy, the leader, as if to defer to her for feedback or approval. Judy attempted to calm the rhythm of the uncertainty with comments such as, " You have great ideas" or "You invented these things." "There is no right answer."

The dance of fear. The dance of fear seemed to occur when the dancers were afraid of the unknown—their new dance partner, action research. Like dancers with new musical scores and choreography, these teachers would need practice to become proficient at dancing with the action research process and the content of their research. At times, the dancers would experience stage fright and appear to lose their feeling for the melodies. The dance of fear began at different times for different teachers. At the elementary site, the dance of fear occurred with the realization of

what they had taken on as they described their first thought as, "Be careful what you wish for now you've got it." With the addition of peer observations another wave of fear occurred. This fear of dancing to no fault observations didn't subside until teachers became more comfortable teaching using performance assessments.

The dance of confidence. In dance that is done well, there is a feeling of balance and harmony and what appears to be effortless coordination. These teacher dancers began dancing harmoniously with their action research partner in a coordinated effort. And so began this majestic strut of confidence. I arrived at the elementary site eight months into their research. Judy, once again, began the focus group with a review of action research and this time she understood and believed in action research. She talked about teachers making changes in their own classrooms and teachers were eager to share their classroom successes. And so the melodies flowed:

"I learned that I needed to do more teacher modeling:

"The research is ongoing"

"This is a whole new way of talking about our classrooms and our teaching."

The Middle School's Dances

Warming up alone before class is an integral part of a dancers' life. John, a second year math teacher, would warm up, practice, and dance alone with action research often throughout the year. John applied to participate in action research without the input of the rest of his math department. John was full of excitement as we spoke about his participation in action research, "It is a lot of work, but it has given me hope. I'm glad that somebody took an interest in what I thought." In dance, there are soloists, and there are also dancers who dance in a group, referred to in ballet as the *corps de ballet*. John would continue dancing solo with action research.

Meanwhile, the other teachers, the *corps de ballet*, danced together still not having met their action research partner. At the first action research meeting at the middle school site, I learned that John had conceived of the project alone. This was the first time that the rest of the department heard about action research in mathematics. At the middle school site, John and the other teachers would often be dancing different dances. While John was initially excited about action research, the other teachers were uncertain about being brought onboard after the fact. As John became uncertain about his ability to motivate the other teachers, they became fearful that action research was a requirement. What seemed to bring them dancing together was the knowledge that action research was voluntary. So a smaller group of math teachers committed to the research and began working together without the experience of the older teachers. This action research team consisted of beginning teachers. The dance of uncertainty reoccurred for these teachers when they could not find the time to meet. No longer was the action research a function of the math department. At my suggestion, we received administrative support to schedule a series of half-day and full-day meetings to work on the content and the process of action research.

The *sols/corps de ballet* configuration faded. All of the dancers were ready to dance together with their dance partner, action research. Teachers began planning the video lessons, analyzing student data, and working together to solve math achievement challenges. There would be curtain calls with the dance of uncertainty but they would be short as they glided back to confidence.

My Dances as the Choreographer

As the project manager, I, too, danced with a new partner in action research. At the beginning of the process, as teachers applied to be included in action research, I danced the dance of excitement because of the overwhelming response from schools and the enthusiasm to participate in action research. My dance turned to uncertainty when others danced to that tune. I wondered if the middle school teachers would be able to find a way to work together and solve their math achievement problems with needed administrative support. Later, I danced the dance of fear, wondering if the sites I chose to follow were going to be viable for this study. I, too, was newly dancing with the dance partner of action research and questioning my skills in leading teachers through this process. During the final months of the project, as teachers became confident researchers and this program received the state staff development recognition award, I felt confidence that "Action research is truly school-based instructional decision making at its best."

Themes

In answering the next research question, "What happens to the teachers who participate in action research?" the findings were organized around four major themes common to both sites, collaboration, collegiality, empowerment, and confidence. These themes emerged from the observations, interviews, and analysis of documents and artifacts. These themes surfaced again and again as the research sites faced new challenges and became more sophisticated and knowledgeable in their role as teacher researchers.

Collaboration

It became evident during this research, that there is much confusion between the words collaboration and collegiality. In some of the literature, the terms are used interchangeably. The definition of collaboration used for this section comes from Carr and Kemmis (cited in Oja and Smulyan, 1989, p. 12).

> Collaboration allows for mutual understanding and Consensus, democratic decision-making, and communication. In collaboration, teachers and researchers set common goals and mutually plan the research design, collect and analyze data and report results.

Collaboration is hard. The teachers at both sites realized early on that they needed to be collaborative to conduct action research. Collaboration was not necessarily operating at either site, and teachers found themselves struggling through the beginnings of their research. Judy remembers collaboration being difficult because it was not the way that teachers at the elementary school were accustomed to working together:

> I don't think that we collaborated at first. I think it took us maybe the entire first and maybe into the second quarter because we weren't used to doing that. We were used to everyone in their own rooms doing their own things. So I think it improved as we went through the process. But I still don't think it's where it could be but only because we didn't start at the beginning to collaborate.

How teachers feel about collaboration. These action research teachers valued collaboration and actively sought other opportunities for mutual planning. John hoped to collaborate with other departments in his school.

> That's the nice thing about action research. We are all going to have different

Ideas and hopefully when the teachers start seeing them that maybe someone else will say, "Let's try this with science. Let's try this with English."

Collegiality

The definition that guided my data analysis is offered by Van Maanen & Barley:

> a collegial environment provides multiple opportunities for interaction and creates expectations of colleagues as regular sources of feedback, ideas, and support. A collegial environment enhances both level of opportunity and level of capacity for teachers, because it serves a critical, essential source of stimulation and motivation (cited in Lieberman, 1988, p. 34).

For more specificity, I consulted the work of Little who suggests that collegiality is the presence of four specific behaviors:

- adults in schools talk about practice
- adults in schools observe each other engaged in the practice of teaching and administration
- adults engage together in work on curriculum
- adults in schools teach each other what they know about teaching, learning, and leading (Cited in Barth, p. 31).

Thus collaboration and collegiality both refer to how teachers interact with one another. However, collegiality emphasizes how teachers talk about their teaching and learn new strategies together, whereas collaboration emphasizes how teachers come to consensus and make decisions together.

A change in collegial relationships. With their action research projects, teachers noticed they had to talk with one another on an ongoing informal basis and they needed to meet more

frequently on a formal basis. All in all, action research was not a process whereby teachers could sit on the sidelines and watch their colleagues. This seemed to indicate a shift at a both sites. Judy remembered that a new type of camaraderie evolved. Even in a small elementary school, teachers on different grade levels seemed to rarely have opportunities to talk and share.

> One teacher came to me and said, "Can I do this? Do you think this will work? I mean we just talk as if we are the best of friends. I just see the staff pulling together because we are on the same wavelength.

John described the day that the math teachers became collegial. The teachers all spontaneously agreed to be videotaped, and, without formal discussion or leadership, teachers began talking about their teaching. John described the moment.

> From a teachers standpoint, we have learned an extreme amount about each other's teaching that we never knew. I have never seen any of the other math teachers teach. We were just watching each other teach on videos. And I think a lot of us were surprised, a lot of us got ideas, and it really opened my eyes to some things.

Action research increases collegiality. The teachers felt strongly that action research increased the frequency and intensity of their collegial relationships. There seemed to be a positive energy in the countless stories of how they had come to start talking together about teaching and learning, and the support that they felt for each other as they tried new instructional approaches.

When I asked, "What is happening as you conduct action research?" the teachers offered an outpouring of reports of collegiality among staff members at both sites:

- "The biggest part, I think, is the staff bonding together and just going out there and trying, seeing if it works and if it doesn't redirect and start over."

- "And since we've been doing this action research, I can now appreciate the techniques other teachers use when presenting a certain topic.
- "I don't really get into talking to other teachers. I don't go down to the faculty room and say, "Do you have anything on this topic. But now I do."

How teachers now view collegiality. During the mixed site end of study focus group, three teachers and a principal commented that they felt that collegiality had increased to a great extent during the action research process. Teachers placed great value on collegiality in their schools. They spoke of wanting collegiality across grade levels, disciplines and schools. Teachers also reported how important collegiality was for them as action researchers. While they agreed that collegiality increased as a result of action research, they also noted that without the levels of collegiality that they established, the action research process would not have moved along as well as it did for them. Gail's comments on collegiality serve as a good summary of how teachers feel:

> I see teams of teachers sharing, teams of teachers openly asking for help and not seeing it as an admission inferior skills but an admission of "Well, gee, wouldn't it be nice to have company while I walk down this new road." Maybe it's people's feelings, or their opinions that really do count, opinions based on what they're learning because of their classes.

Gail's final comments about teachers' opinions having value lead us to the emergence of the next themes, empowerment and confidence.

Empowerment and Confidence

Empowerment and confidence emerged as a pair because other sources indicated that empowerment leads to or creates self-confidence in teachers. Interviews with teachers supported

that empowerment lead to or created their self-confidence. Teachers revealed that they didn't always want to be empowered, that in some ways it was easier to let someone decide and mandate. Even when they wanted to be empowered, the teachers still seemed to yearn for some type of external feedback—until they learned they could provide the feedback for one another. All in all, teachers felt empowered during the action research process to be problem solvers, to analyze data, and to make instructional decisions relative to their data analysis. What they agreed on was the empowerment they experienced through action research process led them to greater feelings of confidence.

Teachers experienced feedback from other teachers and administrators that they were more confident in their teaching and the skills needed to conduct action research. This confidence could be observed as teachers were invited to present at conferences and speak to groups of teachers at their schools and in other settings. Teachers began to view themselves differently in terms of their new leadership roles as teacher researchers. The instructional changes that they made and their resulting confidence had an impact on the relationship between the teacher researchers and their students. Teachers offered students opportunities to provide feedback, interact with one another, and be more creative. This, in turn, resulted in students feeling more confident along side of their teachers. Levels of instructional expertise rose for these teacher researchers. Teachers learned more sophisticated computer skills and were better able to design and implement performance tasks. Generally, these teachers made changes in their overall approaches to teaching.

Results of the Two Sites' Action Research

The origin of the research projects and the subsequent conclusions differed at these two sites.

The Elementary School

At the elementary school, the content of the research was an extension of the work they had begun in previous years. For two years prior to their action research grant, the faculty had begun looking at performance-based instruction. When the state performance standards arrived, teachers knew they needed to become proficient at designing performance tasks, and because they wanted to believe in performance-based instruction, they knew they needed to acquire the necessary classroom skills. Therefore, the content of their action research addressed teacher and student proficiency and comfort level with performance-based instruction. With these guidelines, teachers would design and teach their own tasks.

Teachers at the elementary site identified three important trends relative to the changes in teaching that occurred:

1. Teachers' confidence in their ability to write and use their own performance tasks has increased tremendously since the beginning of the project.
2. The frequency of use of performance tasks has also increased since the beginning of the project.
3. Classroom instruction has been positively affected as a result of performance assessments.

Teacher responses to open-ended staff questionnaires indicated that the role of the teacher was changing because of using performance assessments. As teachers began to devote more instructional time to performance tasks, they felt that they were more of a "guide-on-the-side" rather than a "sage-of-the-stage."

Results from focus group sessions held at the end of each grading period provided additional research results. Teachers reported in their final summary report:

Although developing tasks proved to be time-consuming, teachers felt that it was not as complicated as they had thought. Instructional practices were being informed by what the teachers were individually learning and collectively sharing. They tested their theories, shared results, and learned from one another as a community of learners. Focus group participation fostered increased collaboration around issues of mutual interest and concern.

In addition, these teachers found student feedback to be extremely positive. In their final summary report teachers reported being motivated by their students' interest and excitement:

Teachers have encouraged student risk taking within a supportive environment. As a result, student confidence in their ability to complete multiple-step performance tasks has increased, as has their success in completing a variety of tasks.

Parent feedback to these elementary teachers was also positive. Many students shared their tasks with their parents. Results of a parent survey indicated that parents supported this project.

The elementary school's scores on the state tests increased significantly. Test scores increased in both grades 3 and 5 in all content areas and exceeded the goals stated in their school improvement plan. The 3rd grade scores increased by an average of 26 points and the 5th grade scores increased by an average of 5 points.

Elementary school teachers were able to meet all of their initial objectives and widen the scope of their research. Because their progress with making instructional changes happened at a quicker pace than anticipated, teachers would change their research questions and add a student and a parent component as well as look at themselves as a community of

learners.

The Middle School

By contrast, the middle school teachers had difficulties answering their original questions. The teachers found video production to be a much larger and more complicated task than anticipated. Because of this problem and their need to learn to work together, they modified their research questions to try to narrow their project. Even so, teachers were unable to glean all of the data they had planned for.

For the middle school teachers, the content of their research was not a continuation of their work together. Their plan to improve student scores on the state mathematics assessment by creating video lessons for each of the domains, analyzing the reason for low test scores, and using statistical analysis to determine questions about the learning environment and the students, and by creating an intense review for students before each test was a new project for the department.

In response to their research questions, the middle school teachers made no conclusions regarding video lessons because video lessons were not completed. A partial answer to the reason for low-test scores was given.

> We concluded from these writings that the students misjudged their math ability and that they were overconfident. We also concluded that many students confused their familiarity of the test questions with mastery of the questions. However, this is only one cause for the low scores. We cannot account for factors beyond the school's reach which, as we know, can have a drastic effect on the student's academic performance.

Statistical analysis did answer questions about the learning environment and the students. Teachers learned about their students' individual strengths and weaknesses. They

also found that this analysis displayed patterns that existed among the students' math talents. Teachers reported that keeping organized records on 680 students attendance, class participation, and homework was a "enormously tedious task" and, therefore, the research question 'What effect does attendance, class participation and completion of homework have on student test scores?" was omitted.

Teachers learned a lot from the intense review that they designed and implemented. Looking at the end of the year test scores indicated that the scores did rise by twenty-two percent. Prior to the action research, 46% of the 8th graders passed the math assessments. During the school year, when teachers were conducting action research 68% of the 8th graders passed.

Teachers from the middle school concluded, Multimath forced the math department to focus on math achievement. "Through intense review, data analysis and frequent meetings, we were able to make a positive impact on the scores compared with the past years' scores. It was gratifying to see that all our hard work had paid off even though we did not complete the videos. The worksheets, the database, and the meetings proved to be beneficial. This shows that if a department meets and approaches a problem in an organized manner that much can be accomplished. Our recommendation to our school is for more of the school's resources to be used to create the videos. We also recommend continuing the intense, organized review period before each state assessment. We cannot emphasize enough how important this aspect was to our success."

Final Study Research Questions

The last two research questions that guided this study include: What facilitates the process of action research? What hinders the process of action research? To answer these questions, I analyzed data from interviews, focus groups, and action research portfolios.

This study identifies four factors that facilitate the process of action research:

1. recognition that there is an action research cycle and the skills to progress through this cycle
2. time for teachers to collaborate on their action research
3. internal and external supports for the teacher researchers
4. teacher identification and selection of the research topic

The skills and knowledge that are identified as facilitating the action research process include knowledge of what constitutes qualitative data and ways to collect and analyze these data. More specifically, this study identifies the successful use of focus groups, journaling, informal teacher-constructed open-ended surveys. This study also identifies the necessity of time for teacher to conduct their inquiry. Additional support identified included human resource support for the researchers such as a facilitation team, a principal who supports action research in their school, and technical assistance learning about how to conduct action research.

The fact that teachers identified their own problem areas and solutions empowered teachers to participate in action research. This study shows that teachers know what is not working in their schools and invite the opportunity to offer solutions to these challenges.

This study also identifies three factors that hinder the process of action research:

1. time
2. lack of resources

3. not understanding or using the reflective piece of action research such as journals

Time is identified as a potential challenge for action researchers. Teachers talked about the difficulties of getting together after school and the fatigue they felt to be conducting research after school hours. In addition, teachers at both sites recalled instances when necessary resources or equipment were not easily available. At the beginning of the year, teachers at both sites struggled to learn the action research process, most specifically the reflective pieces, such as journals. This represented a new way of collecting and talking about data.

Implications

This multiple-case study of two schools conducting action research holds some implications for schools and school educational agencies that are interested in conducting action research. These implications address the process of action research, the implementation of action research, and the training issues related to each.

Conducting Action Research at the School Site

- Teachers participating in action research should understand that action research is a cycle and know where they are in it and how to proceed through it.
- Teachers participating in action research should understand that there are specific skills needed for each phase of the action research cycle, i.e., identifying research questions, identifying both qualitative and quantitative data sources, planning for the appropriate analysis of these data sources and providing opportunities for teacher reflection.
- Schools should formulate their own action research questions. Embedding action research questions in existing school improvement plan areas of focus should be considered.

- Collaborative and school-wide action research projects require a great deal of pre-planning in terms of identifying the problem area.
- Having a product as a result of the action research topic should help orient new staff to the action research process and project and foster continuity. It also helps existing staff document where they began and where they progress to.
- Schools should have someone outside of the classroom to tend to the administrative tasks related to their research such as typing, xeroxing, and providing classroom coverage.
- Participation in action research should be voluntary.
- It is important to find ways for action research to be self-sustaining. Finding ways for teachers to continue their research without external support is needed. Hopefully, action research will come to be viewed as a vehicle to be used again and again with different focuses.
- The role of project coordinator is to provide staff development and technical assistance to schools in a large group and at their school sites in areas that they identify.
- Action research has the potential to be one of the major staff development models for the 21st century.

School System Level Support for Action Research Schools

- School systems should consider addressing identified needs, questions, and problems using a competitive action research grant program. There is great potential in using local school sites to research and develop alternative solutions.
- School systems need to provide technical assistance to schools by helping them

develop their ideas and proposals starting at the seed of the idea and continuing throughout.

- School systems should provide monetary support for the conduct of action research. This money can be offered as an incentive for developing an action research plan and is critical to enabling schools to buy time for their inquiry. In return, school systems should make explicit expectations for a concrete product, such as an end-of-research portfolio.
- The monetary support that school systems provide to action research sites should be sizeable enough so that schools have the ability to make substantial changes in instruction and the opportunities for teachers to interact. School systems should assist action research schools in realigning schedules for providing time for teacher research and opportunities for interaction such as focus groups and peer coaching.
- School systems should make formal provisions for attending to and learning from the results of action research.

These implications provide staff developers some interesting areas to explore as they continue their shift from pull-out large group training to facilitating school-based programs for site-based staff development.

Table 1: The Elementary Schools' Dance					
dance	duration	like...	characteristics	observable features	teacher talk
excitement	First four months	• a line dance	• teachers excitedly work together • synchronicity • individual skill • thrill • connected to a group • anonymity • methodical and orderly	• high activity level • open to ideas and possibilities • eager • good attendance • study partners	"Let's go for id" "Learning some thing new together - the entire school." "I'm feeling in control." 'We have some say."
uncertainty	Months four to eight	• a dancer learning a new dance • awkward dance steps • dancers with new partners	• teachers ask questions • teachers defer to a leader	• more subdued • anxious • less willing to share • more questions	"Do we turn this in?" "Is this correct?" "What are the other schools doing?"
fear	Months two to seven	• dancer with stage fright	• dread • apprehension • worrying • different sources of fear	• quiet • defensive • overwhelmed	"Be careful what you wish for." "I lost the focus."
confidence	Months eight to twelve	•majestic strut	• certain • assured • confident • self-esteem	• creativity • willing to take risks • sharing with colleagues • presenting at conferences	"This is a whole new way of talking about teaching." "The pressure is off. "I'm not afraid of being wrong."

Table 2: The Middle Schools' Dance					
dance	duration	like...	characteristics	observable features	teacher talk
excitement	Months 4 to 8	• learning to dance	• learning to work together • having ideas	• participating • working long hours • high activity level	"It made me feel good that I won. It has given me hope."
uncertainty	Months 1 to 4	• person deciding if they want to dance at all	• hesitant • uncomfortable • confused	• lack of eye contact • shifting in seat	"I felt uncomfortable."
uncertainty	Months 4 to 8	• a confused line dance - which way to turn	• looking for a leader • lack of focus • unclear about use of software and Xerox privileges • uncomfortable with the location of the equipment • stressed for time	• quiet • sullen	"I tried my hardest to learn the soft ware." "I still don't feel comfortable working with the computer."
confidence	Months 8 to 12	• a majestic strut	• working together • believing in their research • impromptu • risk taking	• focused • assured	"It's a go!"

Table 3: John's Solo Dance					
dance	duration	like...	characteristics	observable features	teacher talk
excitement	Month 1	• a solo warm-up session	• brimming with ideas • making plans • support • creating	• working long hours • eager • high level of participation	"It made me feel very good that I I won. It has given me hope."
uncertainty	Month 1-3	• a confusion of performance expectations	• hesitant • uncomfortable • quiet friction • confused	• lack of eye • contact • shifting in seat	"I felt uncomfortable."
fear	Months 3-8	• a case of stage fright	• lack of focus • what next?	• asking for help • unable to recognize the problem	"I truly did not understand the time it would take."
confidence	Months 9-12	• strut	• taking risks • creating new instructional approaches • making plans • being focused • delineation of responsibilities	• erect physical stance • eye contact -independence • focus	"I know the problems; I can solve them."

Table 4: The Choreographer's Dances				
dance	duration	like...	characteristics	self-talk
excitement	Month 1	• a choreographer on the first day of rehearsal	• enthusiastic • energized • optimistic	"We are really onto something."
uncertainty	Months 2-3	• a choreographer wondering if I had picked the right performers	• reevaluating • worrying o doubt • concern	"Is this a good site to follow?"
fear	Months 4-6	• a choreographer questioning the choreography	• panic • vulnerability • accountability	"Is this going to work?" "Is action research what we are looking for?"
confidence	Months 6-12	• a perfect production with the choreographer behind	• proud • feeling of accomplishment • satisfaction	"Action research is truly school-based instructional decision making at its' best."

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